Solar Bluetooth GPS Receiver

Model : ST-BT110

User's Manual

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Caution

Read before you start to use:

- Global position system (GPS) is obtained by American Ministry of National Defense, and they got the full responsibility about the preciseness and the maintenance. Any changes may cause the capacity and preciseness of GPS differed.
- If you use this device inside of buildings, tunnels, or any huge objects beside you, the GPS signals might be cut-off or disturbed. Please do not consider that the receiver is malfunction.
- Sometimes the speed-test alarm system may interfere with GPS signal. If it really do, please suspend it temporary.
- The receiver is made by high-technology electronic components. Please do not make it exposed in sunshine for a long time.

0、Quick Start

0.1 Inside the Package

Thank you for purchasing our GPS product, and wish you have the best experience in using. Please open the package, and check if everything in the list exist once you got it. Please tell our salesman if anything missing.

A. Basic package

1. Solar Bluetooth GPS Receiver x 1
2. High capacity rechargeable lithium-ion battery x 1
3. Manual/software CD-Rom x 1
4. Travel charger x1

B. Optional package

In order to support various computers and handheld devices, you may need some accessories inside the package also:

1. Mobile charger x1

0.2 Connect to your PC/PDA

A. Push the power button for 2 seconds, power on the Bluetooth GPS receiver .

B. Put the Bluetooth GPS receiver at proper place (open to sky) to receive the GPS signal.

C. Turn on the power of your PC/PDA.

D. Search for Blue tooth device by your Blue tooth manager on your PC/PDA. The GPS device required no passkey for connection. But some Blue tooth system is forced to enter passkey, please use [0000] in such case.

E. Connect to Solar Bluetooth GPS Receiver and then make sure baud rate set at 9600 bps(standard) in your application program.

F. In firstly Use of this Solar Bluetooth GPS Receiver ,we strongly recommend you to bring

Bluetooth GPS receiver **outdoor or open sky at least 15~20 minutes for sure 3D position fixed and almanac updated.**

1. Introduction

Solar Bluetooth GPS Receiver is a total solution of GPS receiver. High capacity rechargeable lithium-ion battery and solar charger circuit build-in, GPS antenna, Blue tooth transmit/receive system are included. It is designed on the most advantage GPS kernel(**FirstGPS™**), got the full-function, industry-level locating capacity and low prices.

You can use Solar Bluetooth GPS Receiver as vehicles navigator, security system, geographic measurement, investigations or agriculture purpose. Solar Bluetooth GPS Receiver operation requirement is a proper power supply and the open sky-view. Solar Bluetooth GPS Receiver can communicate with other electronic devices by Blue tooth interface. Built-In Flash Memory can save satellite information and do almanac refresh periodically .This will shorten Time To First Fix(TTFF) effectively.

Patent protected Solar Cell design can extend the device usage time up to 30 hrs. This is much longer than competitors'. Lithium-ion battery can be re-charged reasonably under nature or artificial sunlight no matter Solar7 receiver is turned on or off. Most of time ,you are free of charger!

Solar Bluetooth GPS Receiver is designed as a ultra low power consumption device, and high position accuracy. It will update the satellite position every second. The Solar Bluetooth GPS Receiver auto-locating feature is capable of automatically determining a navigation solution without intervention. However, acquisition performance could be interfered and do cold start if the receiver were initialized with occurrence of the following events:

1) First in use

2)The GPS receiver is not in use for more than 3 months or transportation over distances further than 500 kilometers.

3) Failure of the internal memory battery without system standby power.

2. Features and Functions

1)**Total solution in power management.**

Unique Solar Cell re-charging design (patent protected) can extend your GPS operation up to **30** hrs .

2)**Green solution in exactly wireless GPS receiver application**

Always charge your lithium-ion battery under nature or artificial sunlight.

Spare your charger, Spare your space

3) **Considerate LED/switch button design**

easy look, easy touch !one-touch button design keep your hand free

4)**Act as WARM/HOT start with built-in battery**

back-up power design will keep flash memory and RTC clocking always.

Shorten TTFF effectively

5)**Automatically almanac/ ephemeris update in flash mmory**

programmable flash utility to do refresh on satellite orbit data information every 10 minutes.

6) **Smart power management solution.**

GPS Device will automatically shutdown in case of bluetooth un-detected over default time(30 min).

7) Compatible with Bluetooth Serial Port Profile (SPP) completely.

8)Support RTCM (Radio Technical Commission for Maritime Services) real-time deviation correction capacity, can provide the precision smaller then 1 meter.

9)Easy to combine with vehicle, voyage navigation, vehicle management, AVL, personal navigation, tracking system and map applications.

3. Technical Specification

3.1. General

Core Module: firmware by Trimmble FirstGPS™ ,chipset by Ultra low power Xemics Solution

Satellite channel number: all-in-view 8 parallel satellites;

GPS frequency: 1575.42 MHz

Receiver: L1, C/A code.

Antenna type : built-in active antenna

External connector: standard MMCX

3.2. Acquisition Time

Refresh: 1 sec

Code start: <90~120 secs(average, **normally occurred in first use of GPS receiver life**)

Warm start <42 secs(average)

Hot start: <10 secs(average)

Position information update period: 1 sec

3.3. Precision/ Accuracy

A) None-DGPS

Position accuracy: <5m(50% CEP) or <7m(95% CEP)
Speed: 0.05m/sec, typical
Time: 1 sec(satellite time)

B) DGPS (Difference GPS)

Location accuracy: <1m

Speed: 0.05m/sec, typical

3.4. Dynamic condition

Altitude: 18,000m(60,000 feet)
Velocity: 515m/sec(700knod)
Acceleration: 4G(G for gravity unit)
Jerk: 20m/sec

3.5. Power management

A)Applied External Voltage : 5V DC +/- 5%(via charge cable)

B)Power system:

Main battery: Rechargeable Lithium-ion 3.7V battery, as the main power.
Solar Panel: auxiliary power provider

C)Power consumption: 45mA(typical)

D)Battery endurance: Charged with 4 hours(firstly in use), more than 20 hours of working time; with solar charger enabled, up to 30 hours.

3.6. Protocol &Interface

A) Output format

NMEA 0183 V3.01,
Baud rate: 9600 bps(standard)
Data bit: 8
Parity: None
Stop bit: 1

B)Output terminal :Mini -USB

C)NMEA code support:

GPGGA(1 sec interval)
GPGSV(1 sec interval)
GPGSA(1 sec interval)
GPRMC(1 sec interval)

D) Compatible with Blue tooth devices with Serial Port Profile (SPP)

·Blue tooth version 1.1 compliant
·Blue tooth **Class 2** operation (up to 10 meter range)
·Frequency : 2.400 to 2.480 GHz
·Modulation: FHSS / GFSK
·RF channels: 79
·Input Sensitivity: -80dBm
·Output Level: 4dBm

3.7. Dimension/Environment Specification:

Dimension size: 103mm× 55 mm× 22 mm
Weight: < 85gm(battery excluded)
Operation temperature: -10^{o}C to + 70^{o}C

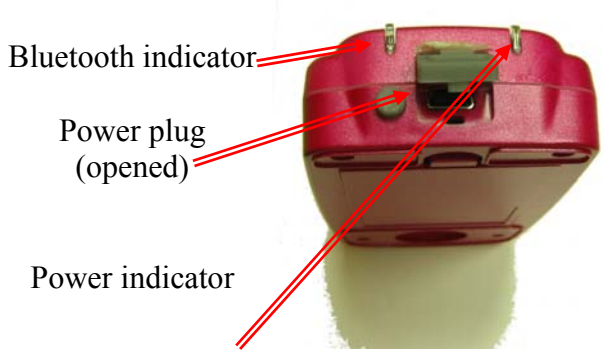
Storage temperature: -40°C to + 85°C

Operation humidity: 5%R.H. to 95%R.H. no compressed

4. Start to Use

Step 1: Charge the battery in first use

Please fully-charge the battery with at least 4 hours before you use the GPS receiver firstly.



Connect charge cable to the power plug at the bottom and start charging

Power Indicator:

(1)**Green** LED blinking

→Power low/charging(see below detail described)

(2) **Green** LED stop to blink &light up

→charge completed (LED will vanish when cable away)

Step 2: Power on, connect with Bluetooth

Push the power switch 1~2 seconds to Power on

Bluetooth indicator :

(1) Bluetooth host searching:

→3 pulses per second

(2) Bluetooth host connected:

→1 pulse per second

Note: Some PDA needs to restart the Bluetooth function if you need to re-connect.

Step 3: GPS function test

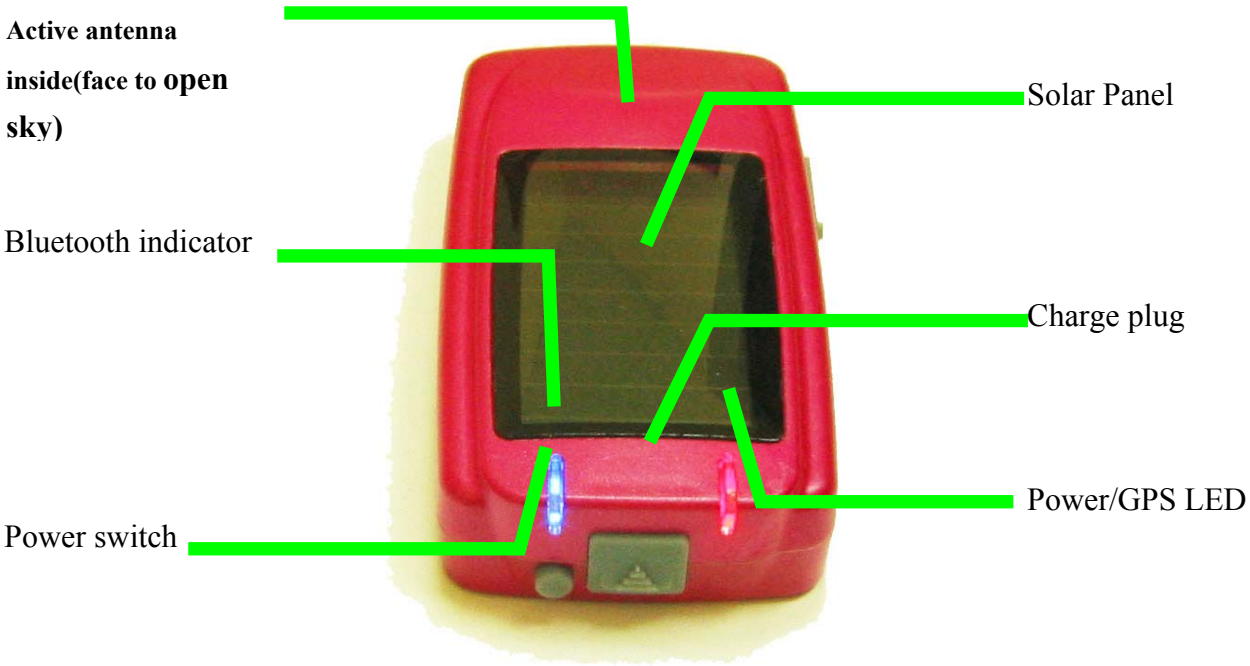
In firstly Use of this Receiver,we strongly recommend to bring your Solar Bluetooth GPS Receiver outdoor and open sky at least 15~20 minutes for almanac update.

Power on the Solar Bluetooth GPS Receiver
GPS Acquisition Fix Indicator
(1)Red LED lights up continuously: Inquiring
(2)Red LED blinks (1 pulse/3 secs): Position fixed

5. Software/Hardware Usage

5.1. Hardware description

1). Solar Bluetooth GPS Receiver device function description is shown as below:



Top View

Side View

2). LED display description

Symbol	Color	Behavior	Description

Blue tooth Indicator	Blue	Blinking in 3 pulses/sec	Searching for Bluetooth host
		Blinking in 1 pulse/sec	Connected with host& communicating
Power/GPS Acquisition LED (Red/Green combined)	Green	Blinking with 3 secs interval	Battery low
	Green	Blinking with 2 sec interval	Charging
	Green	Light up	Charge completed (LED off when cable away)
	Red	Light up continously	Positioning
	Red	Blink in 1pulse/ 3secs	Position fixed

3).Power ON/OFF：

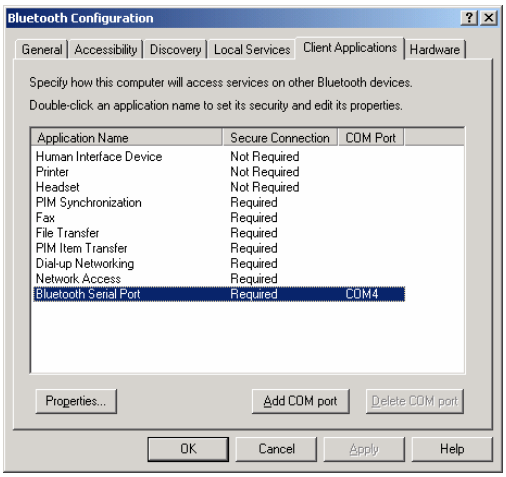
Push button 1~2 seconds

5.2. Configuration setup with PC connection

Here is a sample to show you how to connect Solar Bluetooth GPS Receiver with your PC, software install and basic function test.

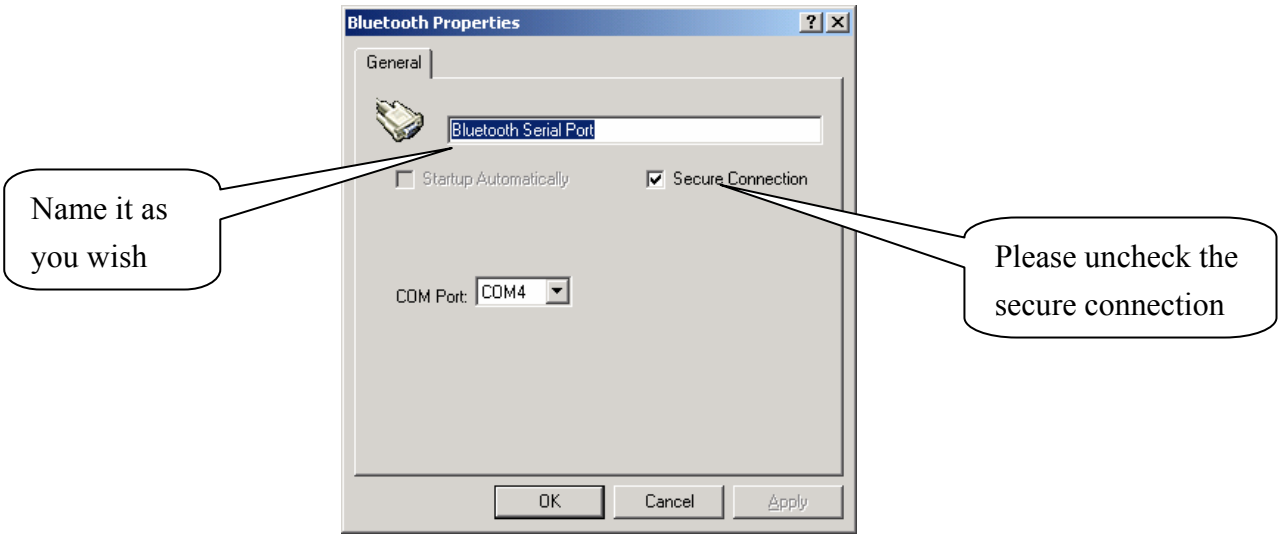
1) First, select a PC with Bluetooth interface. Or you can purchase Bluetooth adapter for your PC. Please contact with your PC's sales about this.

2) Check your Bluetooth manager if there exist any configuration of Bluetooth Serial Port Profile like this:



Note: this sample is for your reference only. The screen may various between different models of Bluetooth manager software.

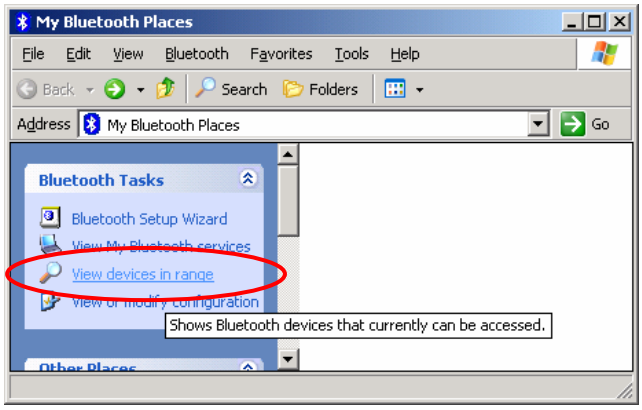
3) If not found, please create a Bluetooth serial port by yourself. The configuration should be like this:



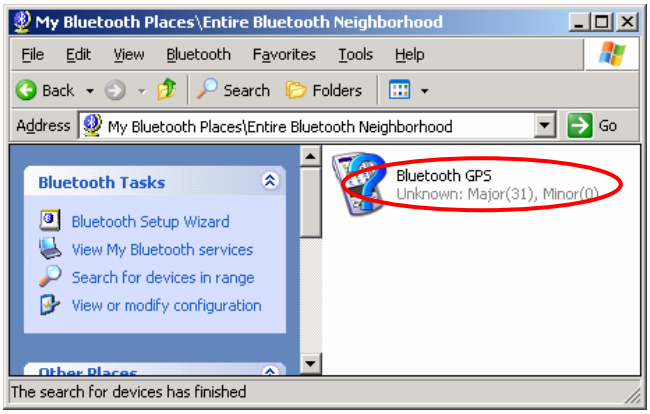
4) If there is already one, please check the content. Some Bluetooth device will enable the secure connection. Please refer to the configuration as above to uncheck it.

5) Power on your Solar Bluetooth GPS Receiver . If the battery is ready, you should see 2 LED light up: the blue LED blink 3 times/sec means Bluetooth is activated and waiting for connection. Another static red LED shows the GPS module is started and is inquiring position information.

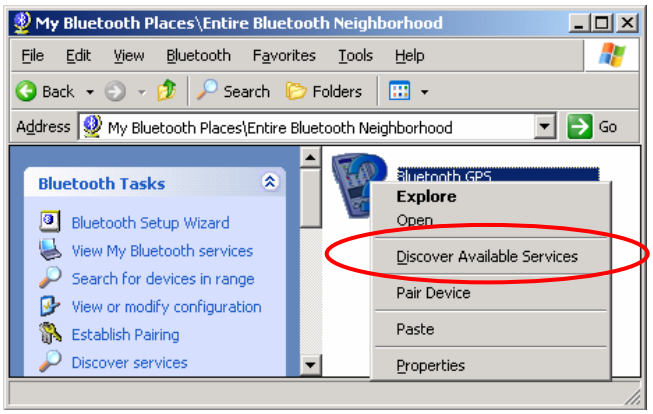
6) Open your Bluetooth places; you should see nothing while using firstly.



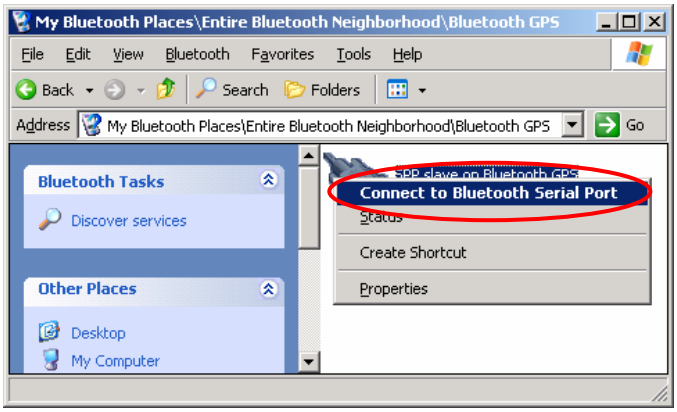
7) Click the [View devices in range] and you should find a [Bluetooth GPS] show as below:



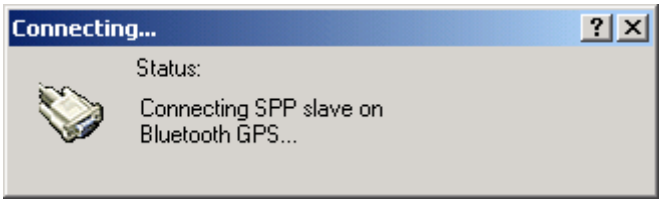
8) Right click on the icon, select the [Discover Available Services]:



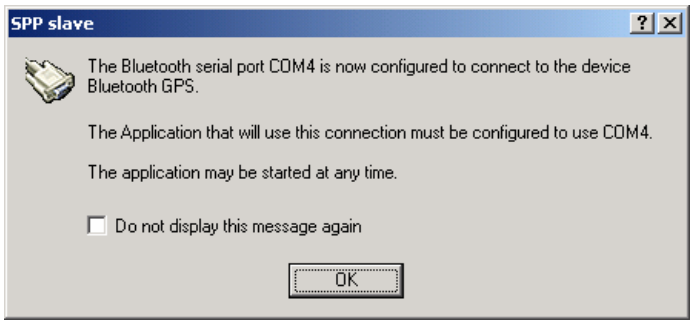
9) You should find the service SPP slave, right click and select [Connect to Bluetooth Serial Port]:



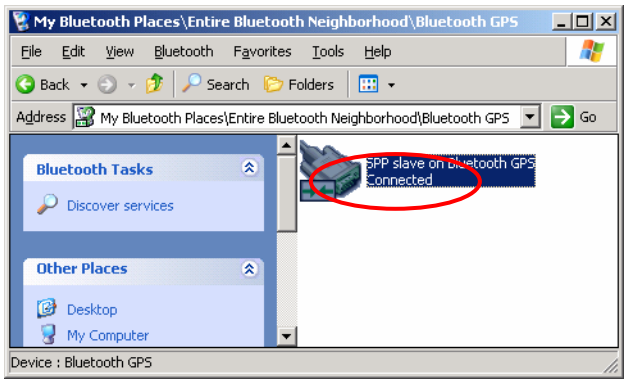
10) The follow message will show:



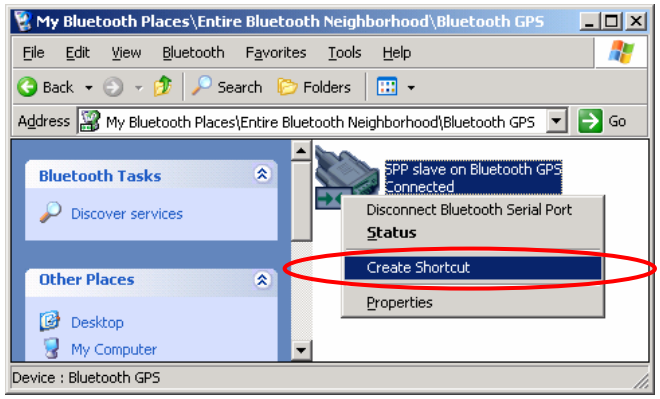
11) And the connection successful message:

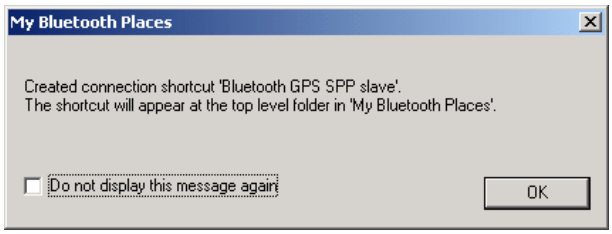

SPP slave
The Bluetooth serial port COM4 is now configured to connect to the device Bluetooth GPS.
The Application that will use this connection must be configured to use COM4.
The application may be started at any time.
Do not display this message again
OK

12) Back to the Bluetooth service view, you should see the icon changed to [Connected]:

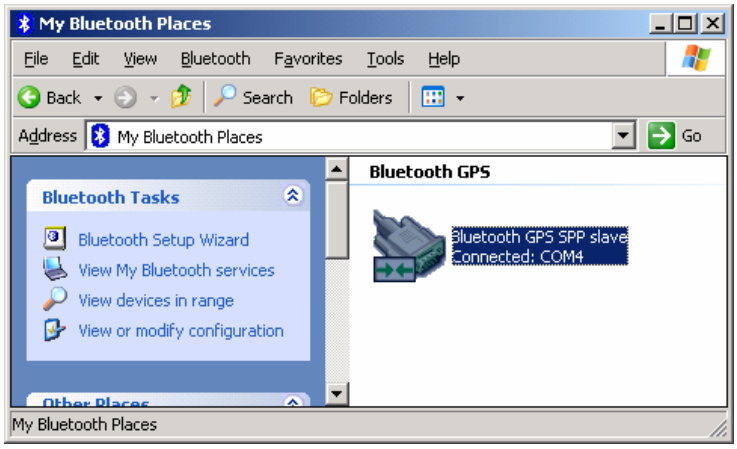


13) If you wish to use the connection more easily next time, you can create a shortcut for this:




My Bluetooth Places
Created connection shortcut 'Bluetooth GPS SPP slave'.
The shortcut will appear at the top level folder in 'My Bluetooth Places'.
Do not display this message again
OK

14) You will see the shortcut you just created:



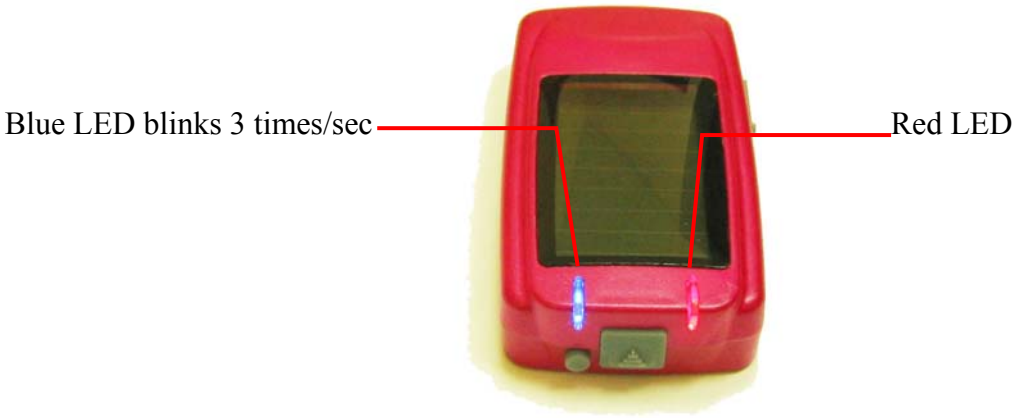
5.3. Configuration setup with PDA connection

Following will show how to configure the Bluetooth connection on PDA, and how to install the GPS Viewer software. It may be different from other PDA models.

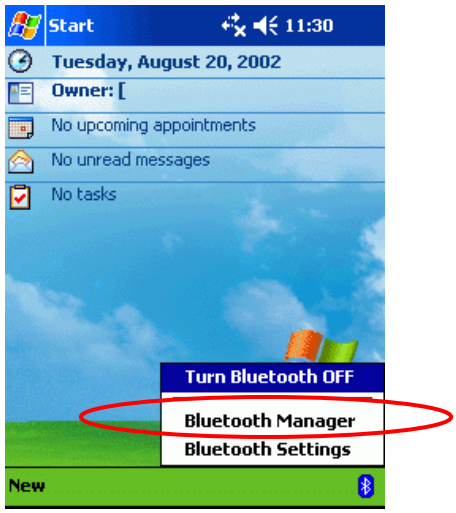
1) Power on your PDA and the Bluetooth host.

2) Power on the Solar Bluetooth GPS Receiver . If the battery is ready, you should see 2 LEDs

indication: the blue for Bluetooth blinks 3 times/sec. It means the Solar Bluetooth GPS Receiver Bluetooth module is activated and waiting for connection. The red LED for GPS, means the GPS module is activated and is inquiring GPS signal.



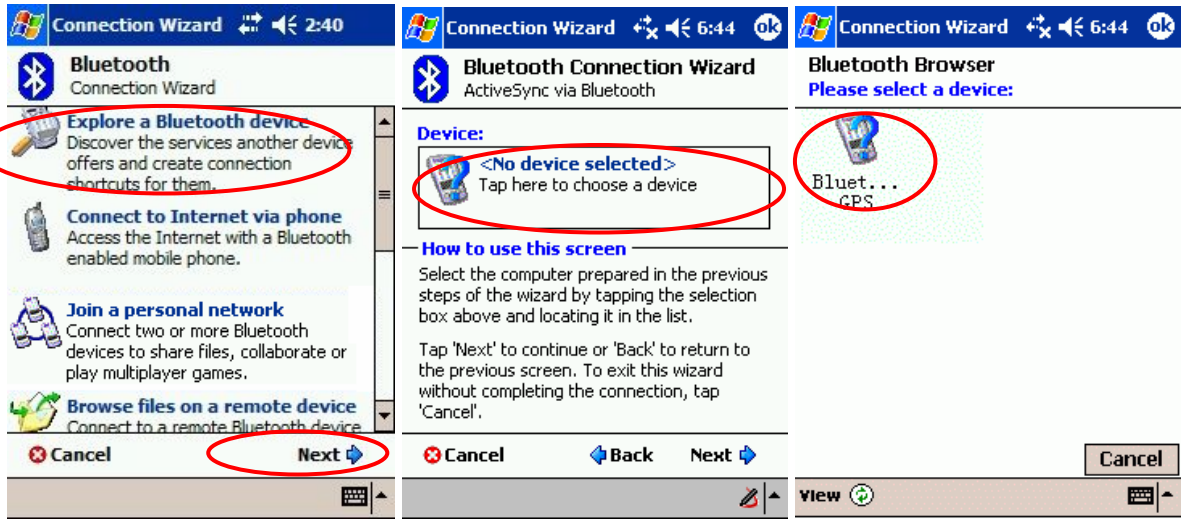
3) See the screen, click Bluetooth mark at bottom, and [Bluetooth Manager] as below:



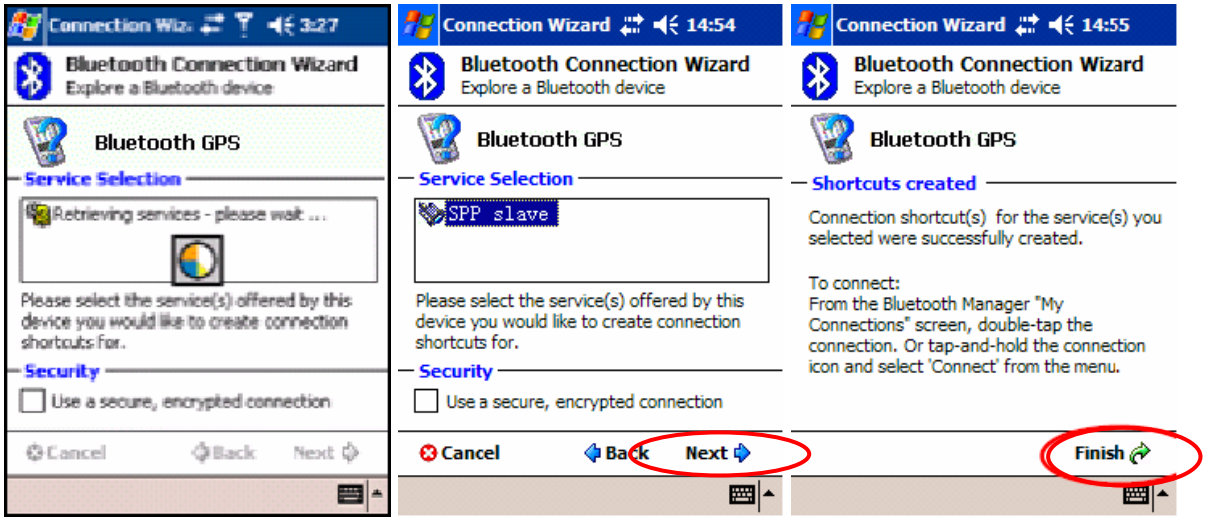
4) If this is your first time to use Bluetooth GPS, click the Bluetooth mark at the bottom as below:

5)Then the Bluetooth connection wizard show up, select [Explore a Bluetooth device] and click [Next]. In the next page, click the box to search Bluetooth devices. Your PDA will find the

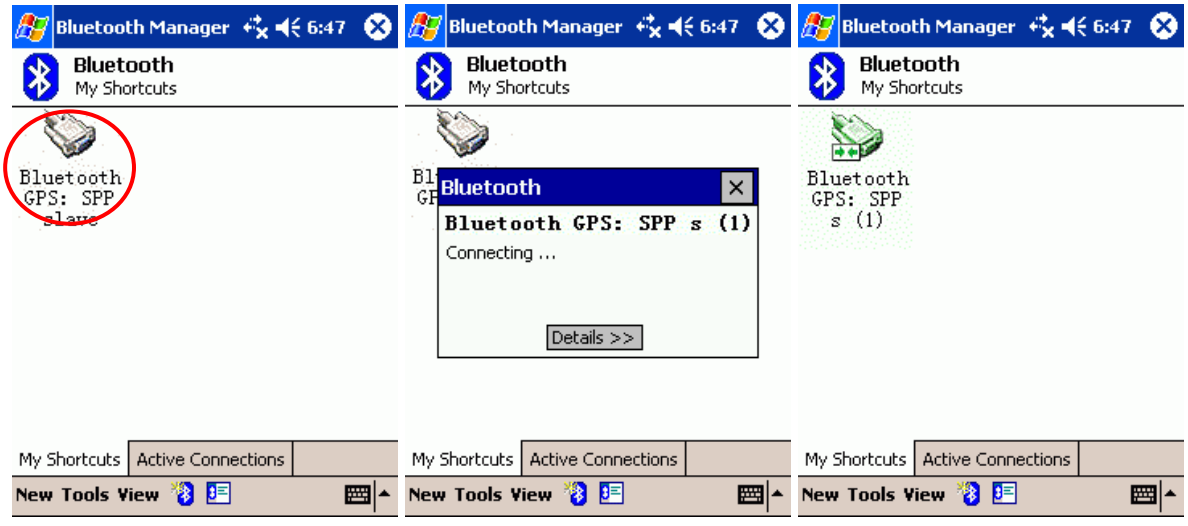
Bluetooth GPS and show it in the window. Click the icon to search for service.


Connection Wizard 2:40
Bluetooth
Connection Wizard
Explore a Bluetooth device
Discover the services another device offers and create connection shortcuts for them.
Connect to Internet via phone
Access the Internet with a Bluetooth enabled mobile phone.
Join a personal network
Connect two or more Bluetooth devices to share files, collaborate or play multiplayer games.
Browse files on a remote device
Cancel
Next
Connection Wizard 6:44
Bluetooth Connection Wizard
ActiveSync via Bluetooth
Device:
<No device selected>
Tap here to choose a device
How to use this screen
Select the computer prepared in the previous steps of the wizard by tapping the selection box above and locating it in the list.
Tap 'Next' to continue or 'Back' to return to the previous screen. To exit this wizard without completing the connection, tap 'Cancel'.
Cancel
Back
Next
Connection Wizard 6:44
Bluetooth Browser
Please select a device:
Bluet...
GPS
Cancel
View

6) Back to the [Explore a Bluetooth device] as below. Click [Next] to list service on Bluetooth GPS. [SPP slave] should appear in the service list box, click it and click [Next] to finish shortcut creation. Don't forget to uncheck the secure connection box.


Connection Wiz 3:27
Bluetooth Connection Wizard
Explore a Bluetooth device
Bluetooth GPS
Service Selection
Retrieving services - please wait ...
Please select the service(s) offered by this device you would like to create connection shortcuts for.
Security
Use a secure, encrypted connection
Cancel
Back
Next
Connection Wizard 14:54
Bluetooth Connection Wizard
Explore a Bluetooth device
Bluetooth GPS
Service Selection
SPP slave
Please select the service(s) offered by this device you would like to create connection shortcuts for.
Security
Use a secure, encrypted connection
Cancel
Back
Next
Connection Wizard 14:55
Bluetooth Connection Wizard
Explore a Bluetooth device
Bluetooth GPS
Shortcuts created
Connection shortcut(s) for the service(s) you selected were successfully created.
To connect:
From the Bluetooth Manager "My Connections" screen, double-tap the connection. Or tap-and-hold the connection icon and select 'Connect' from the menu.
Finish

7) Back to the main screen of [Bluetooth manager] as below. Please double-click the icon to connect Solar Bluetooth GPS Receiver . If connection successful, a green arrow will show as below at right.

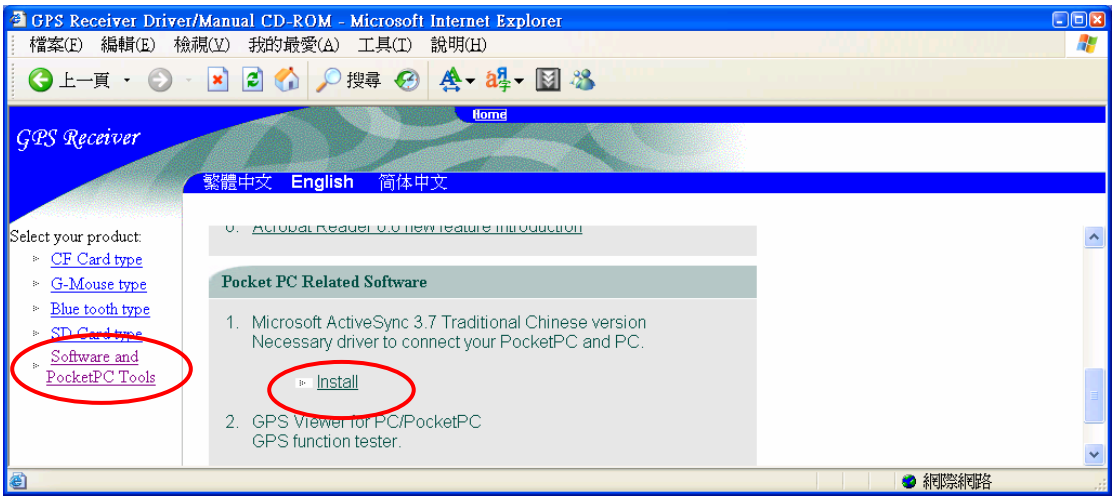


8) You may start to use any map/navigation software and use the GPS function now. Or you can use the GPS Viewer software bounded in our CD-Rom to verify the function of Solar Bluetooth GPS Receiver as you wish.

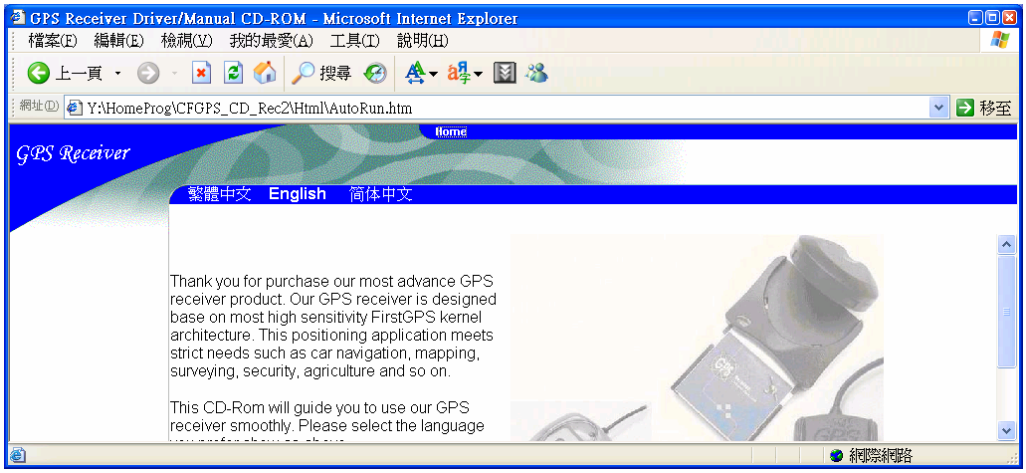
5.4. GpsViewer Software Install/Usage Guide

After the Bluetooth connected, you may use Solar Bluetooth GPS Receiver in any software support GPS function. We have provided you the software: GPS Viewer, for you to test the basic function of GPS. You may use it to verify if your GPS device works. Attention! GPSViewer for PDA supports only Microsoft Pocket PC 2002 or fully compatible operation systems. Please do not use it on any non-compatible system like Palm or SONY CLIE, etc

1) Please make sure your PDA is connected properly with your PC using Microsoft ActiveSync. If you have not install ActiveSync yet, you can install the copy from the bounded CD-Rom, version 3.7.1. Please connect your PDA with your PC by the cable/cradle for your PDA, it should be found in your PDA accessory pack.



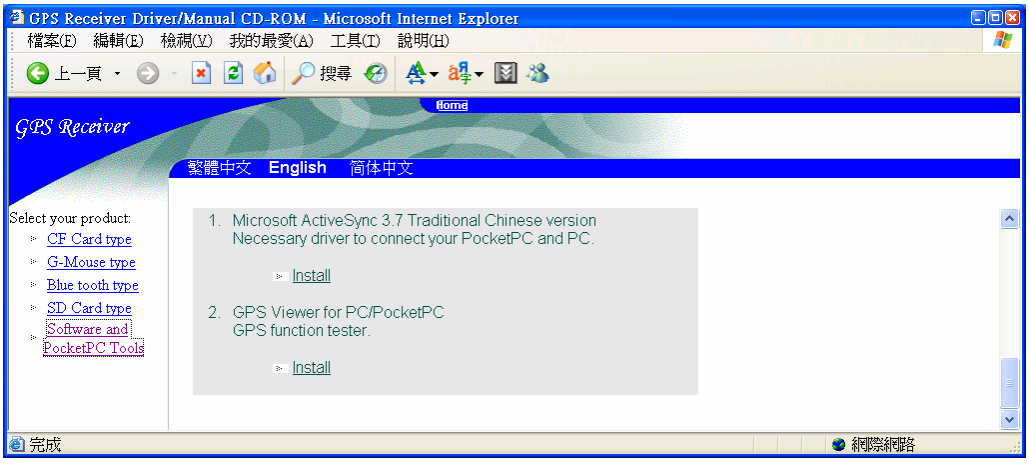
2) Insert the CD-Rom into your CD drive. If your auto-run function works, you will see the welcome screen as below:


GPS Receiver Driver/Manual CD-ROM - Microsoft Internet Explorer
檔案(F) 編輯(E) 檢視(V) 我的最愛(A) 工具(T) 說明(H)
上一頁 搜尋
網址(D) Y:\HomeProg\CFGPS_CD_Rec2\Html\AutoRun.htm
移至
GPS Receiver
Home
繁體中文 English 简体中文
Thank you for purchase our most advance GPS receiver product. Our GPS receiver is designed base on most high sensitivity FirstGPS kernel architecture. This positioning application meets strict needs such as car navigation, mapping, surveying, security, agriculture and so on.
This CD-Rom will guide you to use our GPS receiver smoothly. Please select the language
網際網路

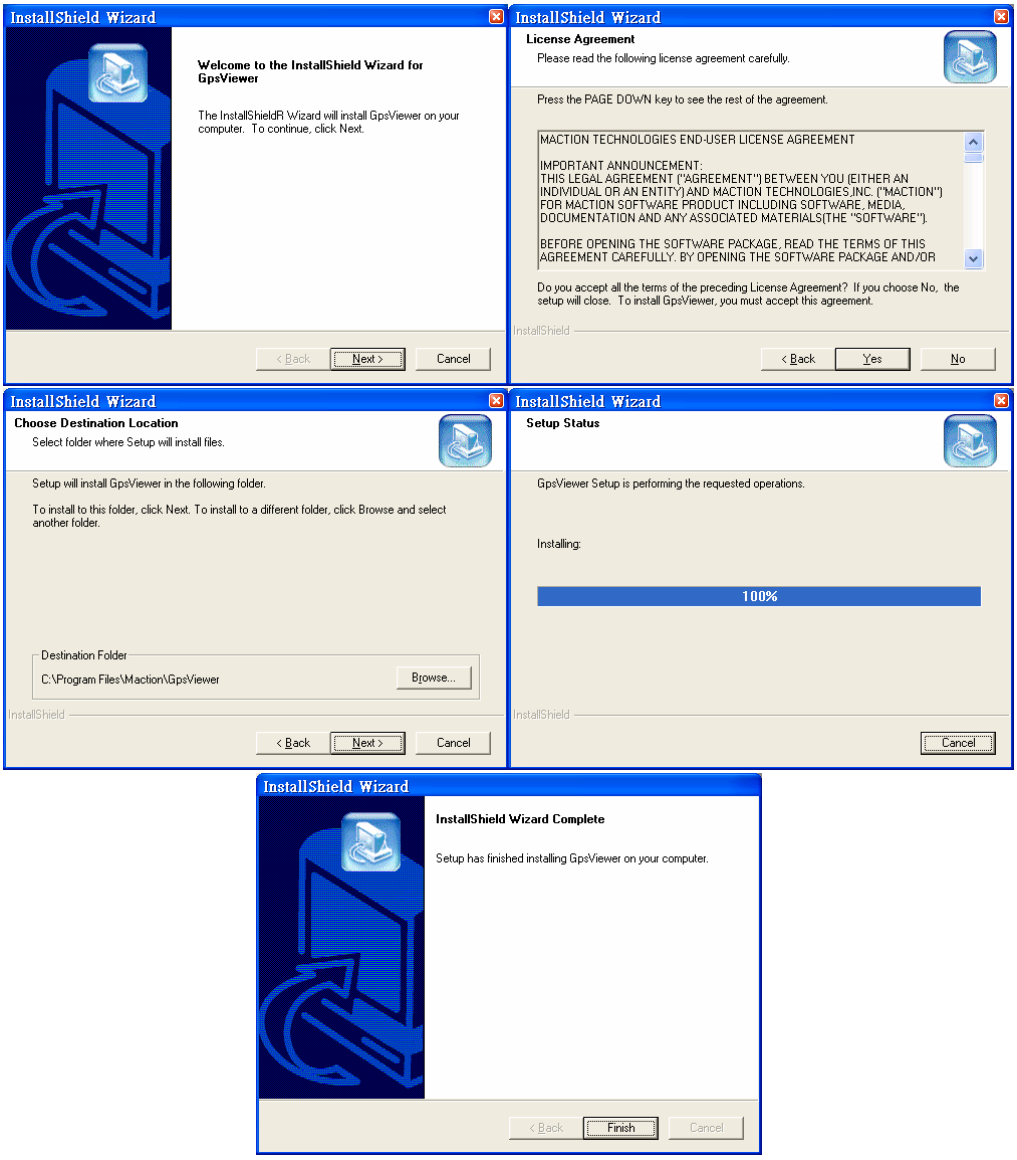
3) Select the language you preferred. We choose the “English” here:

GPS Receiver Driver/Manual CD-ROM - Microsoft Internet Explorer
檔案(F) 編輯(E) 檢視(V) 我的最愛(A) 工具(T) 說明(H)
上一頁 搜尋
GPS Receiver
Home
繁體中文 English 简体中文
Select your product:
CF Card type
G-Mouse type
Blue tooth type
SD Card type
Software and PocketPC Tools
Thank you for purchase our most advance GPS receiver product. Our GPS receiver is designed base on most high sensitivity FirstGPS kernel architecture. This positioning application meets strict needs such as car navigation, mapping, surveying, security, agriculture and so on.
This CD-Rom will guide you to use our GPS receiver smoothly. Please select your product show as left for further steps.
file:///Y:/HomeProg/CFGPS_CD_Rec2/Html/Eng/Eng.htm
網際網路

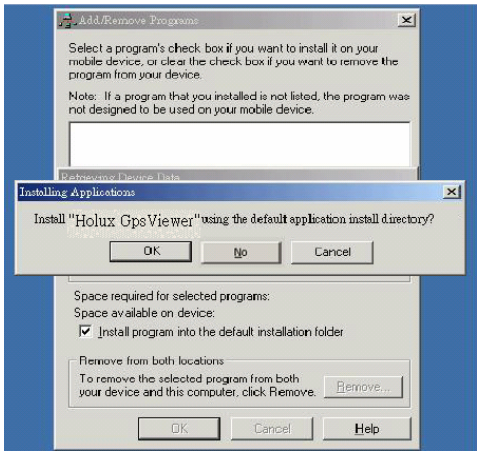
4) Click the [Useful tools and PocketPC utility] at the left:

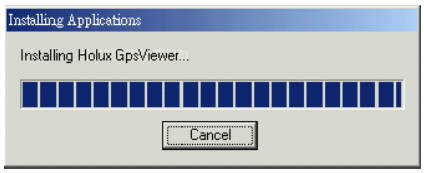


5) Click the [Install] at the right screen. The setup screen will show up. Please follow the screen guide to install step by step:


InstallShield Wizard
Welcome to the InstallShield Wizard for GpsViewer
The InstallShield® Wizard will install GpsViewer on your computer. To continue, click Next.
< Back
Next >
Cancel
InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
Press the PAGE DOWN key to see the rest of the agreement.
MACTION TECHNOLOGIES END-USER LICENSE AGREEMENT
IMPORTANT ANNOUNCEMENT:
THIS LEGAL AGREEMENT ("AGREEMENT") BETWEEN YOU (EITHER AN INDIVIDUAL OR AN ENTITY) AND MACTION TECHNOLOGIES,INC. ("MACTION") FOR MACTION SOFTWARE PRODUCT INCLUDING SOFTWARE, MEDIA, DOCUMENTATION AND ANY ASSOCIATED MATERIALS(THE "SOFTWARE").
BEFORE OPENING THE SOFTWARE PACKAGE, READ THE TERMS OF THIS AGREEMENT CAREFULLY. BY OPENING THE SOFTWARE PACKAGE AND/OR
Do you accept all the terms of the preceding License Agreement? If you choose No, the setup will close. To install GpsViewer, you must accept this agreement.
InstallShield
< Back
Yes
No
InstallShield Wizard
Choose Destination Location
Select folder where Setup will install files.
Setup will install GpsViewer in the following folder.
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.
Destination Folder
C:\Program Files\Maction\GpsViewer
Browse...
InstallShield
< Back
Next >
Cancel
InstallShield Wizard
Setup Status
GpsViewer Setup is performing the requested operations.
Installing:
100%
InstallShield
Cancel
InstallShield Wizard
InstallShield Wizard Complete
Setup has finished installing GpsViewer on your computer.
< Back
Finish
Cancel

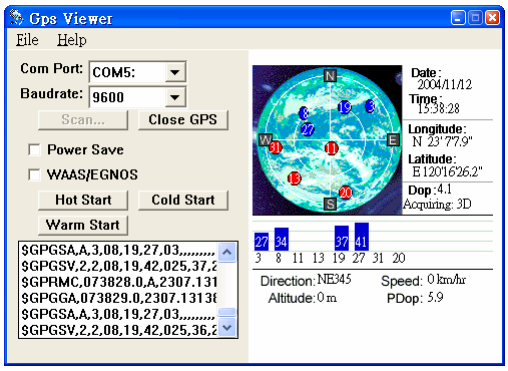
6) If your PDA is connected correctly, the installer will call Microsoft active synchronize and install it. You can install them right now. The install procedure is complete.


Add/Remove Programs
Select a program's check box if you want to install it on your mobile device, or clear the check box if you want to remove the program from your device.
Note: If a program that you installed is not listed, the program was not designed to be used on your mobile device.
Installing Applications
Install "Holux GpsViewer" using the default application install directory?
OK
No
Cancel
Space required for selected programs:
Space available on device:
Install program into the default installation folder
Remove from both locations
To remove the selected program from both your device and this computer, click Remove.
Remove...
OK
Cancel
Help

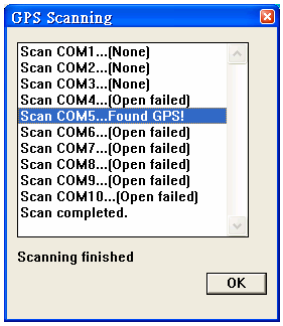


7) The installer will create an icon on your desktop. Please double-click it to start program:

8) GPS Viewer main screen will shows up, please select the proper COM port ID and baud rate, and click [Open GPS] to begin the test. The COM port id is COM5 in our PC; please select the corresponding ID base on your Bluetooth manager. Please select 9600 as your baud rate as below:



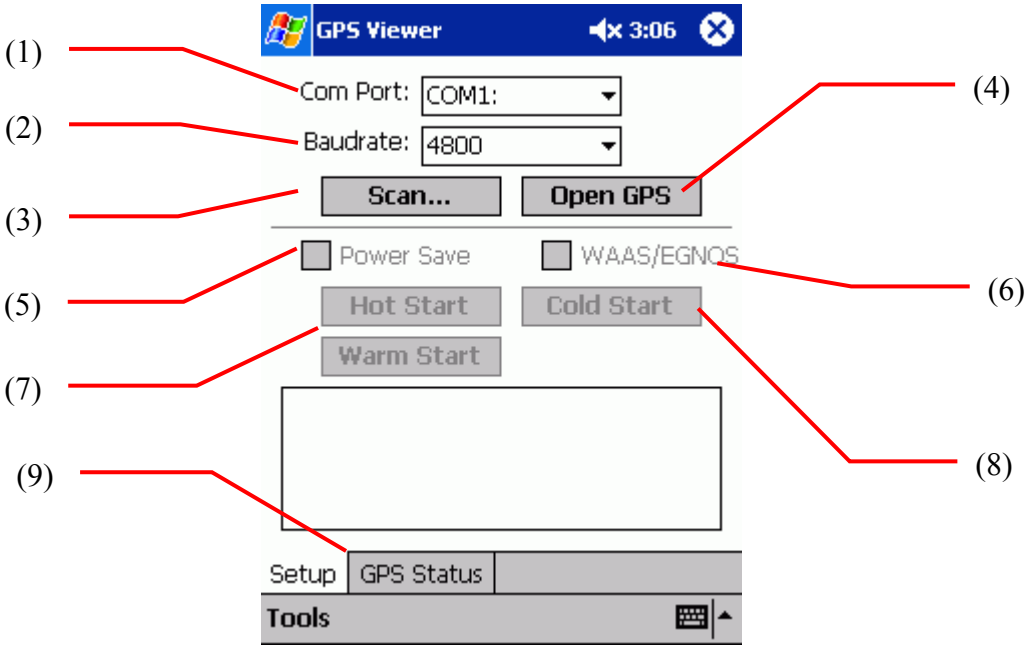
9) If you just cannot determine the COM port ID for your Bluetooth GPS, you may click [Scan…] to scan it automatically:



Attention! The following steps show the usage of GPSViewer for PDA. Please follow the operations on your PDA.

10) See your PDA and click [Start]->[Programs]->[GPSViewer] as below:

11) Here is the main screen of GPSViewer, and the basic function description as below:



(1) Com Port: COM port ID to connect with GPS device.

(2) Baud rate: COM port data transfer rate.

(3) Scan: Search the COM port ID automatically.

(4) Open GPS: Connect to GPS receiver.

(5) Power Save: The GPS receiver working in an extremely low power cost, extra power saving mode is not necessary.

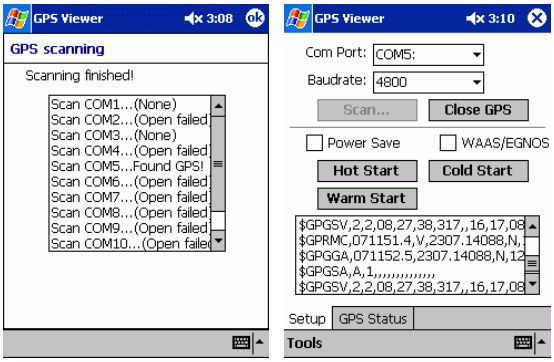
(6) WAAS/EGNOS: Enable the synchronous GPS satellite receiving function (Support only the area with synchronous satellites, not available in Asia currently)

(7) Hot Start/Warm start: Hot start, warm start (For test only)

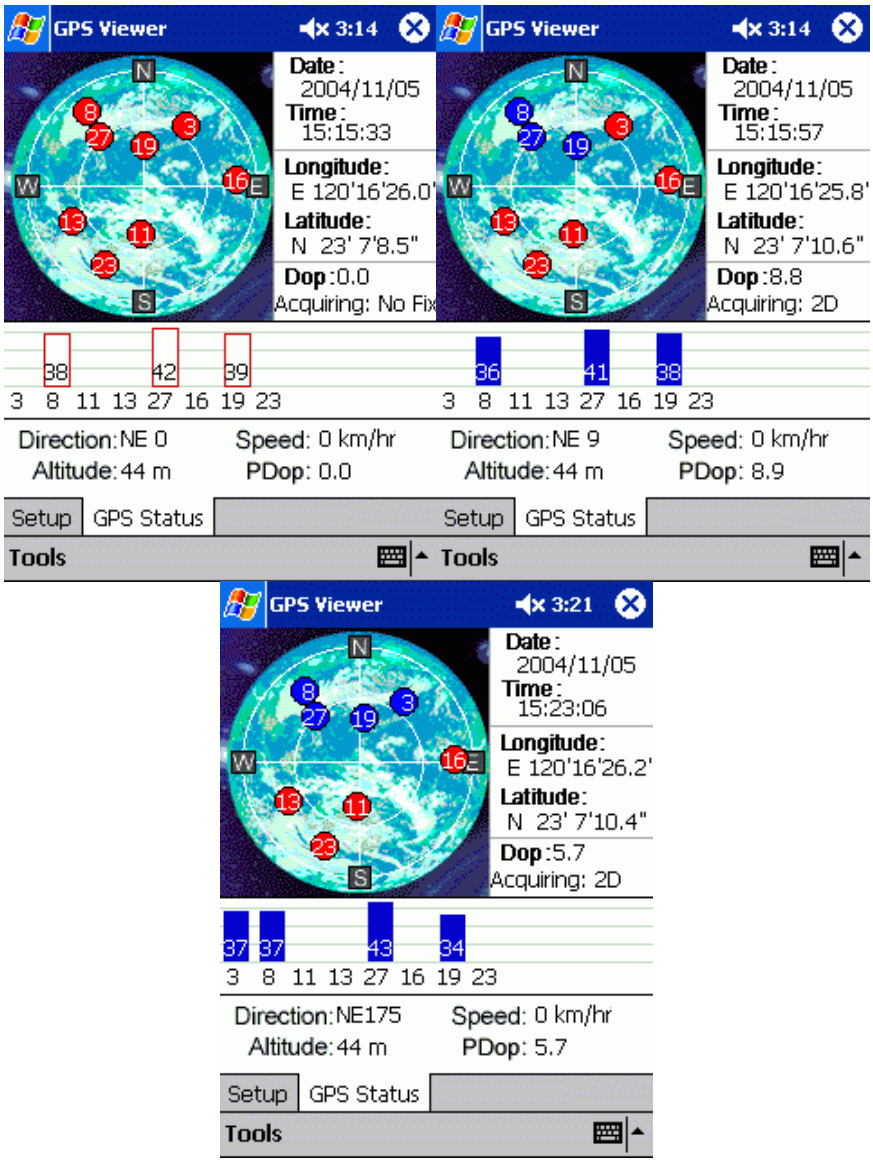
(8) Cold start: Clean the date/time and previous satellites information in GPS flash ROM. It will force GPS receiver to re-calculate satellites information. It is necessary if the GPS receiver didn't get satellites information over 60 days, or re-locate over 500 km.

(9) GPS Status: Show the satellites map and data flow from the GPS receiver.

12) Select ***9600*** as the baud rate, click [Scan] to auto-detect where the GPS receiver is mapped to your PDA. For example, most PDA will set COM 8 as its Bluetooth SPP slave COM port ID. After the COM port found, you can click [Open GPS] to start test. As blow:



13) Click [GPS Status] to see the satellite view. If the GPS receiver can acquire position successful, the position fix result will show as below:



6. Warranty

The Bluetooth GPS receiver is warranty for free from defect in material and function for 1 year from the date of purchase. Any failure of this product within the period under normal conditions will be replaced at no charge to the customers.

This warranty does not cover failures due to abuse, misuse, accident, or unauthorized alteration or repairs, inappropriate disassemble.

- Since the Solar Bluetooth GPS Receiver got high performance rechargeable lithium-ion battery, we are strongly recommend you not to place it under the sunshine for a long time.
- The warranty will become invalid if any mis-operation found.

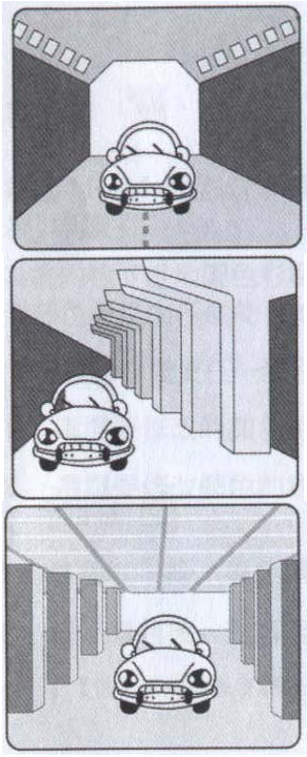
7. Trouble Shooting

7.1 Problem of Setup

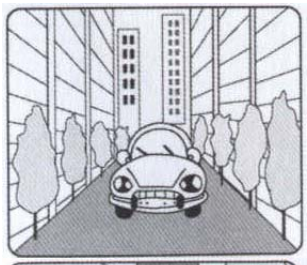
Error/Problem	Cause	Trouble shooting
Can not find the GPS device through Bluetooth interface	Install not correct or battery low	Check if Solar Bluetooth GPS Receiver is installed properly, and confirm the battery level is suitable (green LED blinks or none LED)
Unable the connect through Bluetooth	Configuration incorrect	Please refer section 5.2 to re-install. Or refer to your PDA's user manual for configuration.
Fail to open COM Port	Bluetooth manager is not configured properly, or the COM port is adopted by another software.	Please check your Bluetooth manager settings, close the software may use COM ports and try again. Or check if there is any password protection.
No NMEA code (GPS data flow)	(1) Some PC/PDA will enter the power saving mode if you stop input for a few minutes. Bluetooth interface will be reset in such case. **(2) Wrong baud rate/com port setting** **(3) Bluetooth interrupted**	(1) Disable the power saving mode, try to connect GPS receiver again. **(2) Correct with right baud rate & com port** **(3) Re-connect bluetooth device**
Unstable GPS signal	**(1) degraded by anti-sunlight film with receiver placed inside car** **(2) some cases described in sec7.2**	**Plug External antenna and place on car roof**
Poor GPS signal	**(1) Solar Storm effect** **(2) Atmosphere turbulences** **(3) SA ON by USA military .**	**NA**

7.2 Concerning of Poor GPS Signal

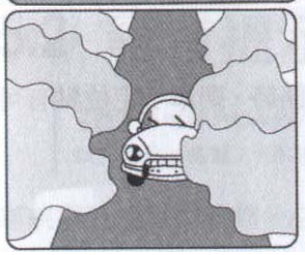
It is possible unable to receive GPS signal or signal low in these places:



- Inside the tunnel, GPS signal is blocked.
- Covers above, GPS signal is blocked.
- Inside buildings, GPS signal is blocked.



➢ Beside some buildings, GPS signal is disturbed.



➢ Inside forests, or too many covers, GPS signal is disturbed.

- If you use Solar Bluetooth GPS Receiver inside the car, some anti-sunlight windscreen film will makes the GPS signal degrade or signal lost .
- GPS satellite is owned by America military, sometimes they will tune-down the accuracy by some reason. In such cases, the GPS position may not fixed exactly.